

Fig. of Supdt. ....

KT-XI-1601  
**PHYSICS**  
(Part - I)  
(Fresh / New Course)

Roll No. ....

Fig. # .....

Fig. # .....

Total Marks: 85

**PHYSICS**  
(Part - I)  
(Fresh / New Course)

Time Allowed : 3 Hrs.

Marks: 18

**Section "A"**

Time : 20 Mins.

**NOTE :** Section-A is compulsory. All parts of this section to be answered on the questions paper itself. It should be completed in the given time and handed over to the Centre Superintendent. Deleting / Overwriting is not allowed. Do not use lead pencil.

**NOTE :** Insert the correct option (a, b, c, d) in the empty box opposite to each part.

Insert the correct option (a, b, c, d) in the empty box opposite to each part. Each part carries one mark.

- i) Which one is pair of SI base units? a  
(a) Ampere-Kelvin (b) Joule-Second (c) Newton-Meter (d) Kilogram-Ohm
- ii) The scientific notation of a number 0.0023 is expressed as ; b  
(a)  $2.3 \times 10^{-4}$  (b)  $2.3 \times 10^{-3}$  (c)  $0.023 \times 10^{-2}$  (d)  $0.23 \times 10^3$
- iii) The addition of vectors is ; a  
(a) Commutative (b) Not commutative  
(c) Commutative as well as non commutative (d) All of these
- iv) The dot product of two perpendicular vectors is ; d  
(a) Maximum (b) Positive (c) Negative (d) Zero
- v) The slope or gradient of velocity time graph is called ; c  
(a) Displacement (b) Distance (c) Acceleration (d) Velocity
- vi) The range of a projectile is maximum for the angle of projection of measure ; b  
(a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- vii) The SI unit of gravitational potential is ; b  
(a) J Kg (b)  $\text{J Kg}^{-1}$  (c) JS (d) Watt x S
- viii) Expression for moment of inertia of a solid cylinder is ; b  
(a)  $MR^2$  (b)  $0.5 MR^2$  (c)  $0.4 MR^2$  (d)  $0.2 MR^2$
- ix) The product of moment of inertia and angular velocity is called ; d  
(a) Torque (b) Rotational K.E. (c) Angular acceleration (d) Angular momentum
- x) A person standing near the track of a fast moving train has tendency to fall toward it because of ; c  
(a) Vibration due to motion of train (b) Gravitation force of attraction between person and train  
(c) High speed of train (d) None of these
- xi) The quantity which shows the state of motion of an oscillator is known as ; c  
(a) Phase constant (b) Phase change (c) Phase (d) All of these
- xii) In an isolated system the total energy of vibrating mass and spring is ; d  
(a) Variable (b) Low (c) High (d) Constant
- xiii) The various features of water waves can be studied by an apparatus known as ; c  
(a) Sonometer (b) Interferometer (c) Ripple tank (d) Spectrometer
- xiv) Which one of the following factors has no effect on the speed of sound in a gas? b  
(a) Humidity (b) Pressure (c) Temperature (d) Density
- xv) Thomas Young performed his famous double slit experiment in the year; b  
(a) 1800 (b) 1801 (c) 1900 (d) 1901
- xvi) The principle of interference through a thin film is based on the division of ; b  
(a) Wavelength (b) Amplitude (c) Frequency (d) All of these
- xvii) The system in which there is a transfer of mass across its boundary is called ; c  
(a) Closed (b) Isolated (c) Open (d) None of these
- xviii) In an isochoric process work done is ; d  
(a) Positive (b) Negative (c) Positive as well as negative (d) Zero

Total Marks : 67

Time Allowed : 2:40 Hrs.

Section - B

Marks : 40

Q. 2 Write short answers of any TEN of the following parts. Each part carries equal marks.

- (i) What is meant by significant figures? Describe the rules for finding significant figures in a measurement.
- (ii) A point object, acted on by forces 4N, 5N and 6N, is in equilibrium. If the 6N force is removed, what is the resultant force on the object?
- (iii) The magnitude of dot and cross products of two vectors are  $6\sqrt{3}$  and 6 respectively. Find the angle between the vectors.
- (iv) State and explain the law of conservation of linear momentum.
- (v) Can the velocity of a body reverse the direction when acceleration is constant? If you think so give an example.
- (vi) A man rowing a boat upstream is at rest with respect to shore, is he doing work, Explain.
- (vii) Explain the significance of moment of inertia in rotatory motion.
- (viii) When water falls from a tap, its cross sectional area decreases as it comes down. Explain Why?
- (ix) Differentiate between free and forced oscillations. Give one practical example of each.
- (x) Briefly describe the beats phenomenon.
- (xi) The speed of sound in air at  $0^{\circ}\text{C}$  is  $332\text{ ms}^{-1}$ . What will be the speed of sound at  $20^{\circ}\text{C}$ ?
- (xii) How you can explain Brewster's law of polarization?
- (xiii) Can a room be cooled by leaving the door of an electric refrigerator open? Explain.

Section - C

Marks : 27

NOTE : Attempt any THREE questions. Each question carries equal marks.

- Q. 3 (a) What is projectile motion? Derive mathematical equations for
  - (i) Maximum height attained
  - (ii) Range of a projectile
- (b) Calculate the angle of projection for which K.E. at the highest point of its trajectory is equal to one fourth of its K.E. at point of projection.
- Q. 4 (a) Explain the concept of Real and Apparent Weights in detail.
- (b) A spring balance attached to the ceiling of a moving elevator indicates the weight of a body which weighs 980 N on ground as 1470N. Find out the direction and magnitude of the acceleration of elevator.
- Q. 5 (a) Derive equations for K.E. and P.E. of a body of mass "m" executing S.H.M.
- (b) A mass at the end of spring describes S.H.M. with  $T = 0.40\text{ S}$ . Find out  $\bar{a}$  when the displacement is 0.04 m.
- Q. 6 (a) What is meant by polarized light? Explain polarization of light by selective absorption method.
- (b) Find the polarizing angle for a glass of refractive index of 1.55.